

III. IN THE CLAIMS

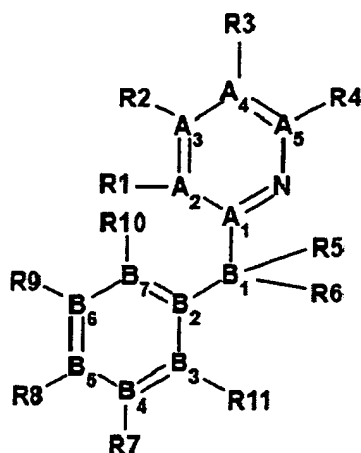
Please amend the affected claims as set forth below:

Claim 1 (Previously Presented). Substrate for packaging of or for attachment to products which are sensitive to aging and temperature, having a time-temperature integrator arranged in the region of the substrate, wherein the time-temperature integrator contains a matrix and at least one reversible, crystalline indicator embedded therein, which has photochromic properties on the basis of transfer reactions in crystalline materials, and wherein further the reversible indicator is characterized by discoloration following photo-induced coloration thereof, the discoloration of the reversible indicator proceeding as a function of both time and temperature.

Claims 2 (Previously Presented). Substrate according to claim 1, wherein the substrate is a packaging material.

Claim 3 (Previously Presented). Substrate according to claim 1, wherein the transfer reactions are based on the transfer of charged or uncharged hydrogen atoms or hydrogen isotopes.

Claim 4 (Currently Amended). Substrate according to claim 1, wherein the reversible indicator has a skeletal structure according to the general formula I:



wherein A₁-A₅ = carbon atom and/or heteroatom

R₁-R₄ = hydrogen atom and/or isotope thereof, and/or Cl, F, Br, and/or a substituent selected from the group consisting of alkyl groups, ~~methyl or~~ and aryl groups, ~~and~~ phenyl groups

R₅ = hydrogen atom or isotope thereof, or a substituent selected from the group consisting of Cl, F, Br, an alkyl group, ~~a methyl group,~~ and an aryl group, ~~phenyl group, and pyridine~~

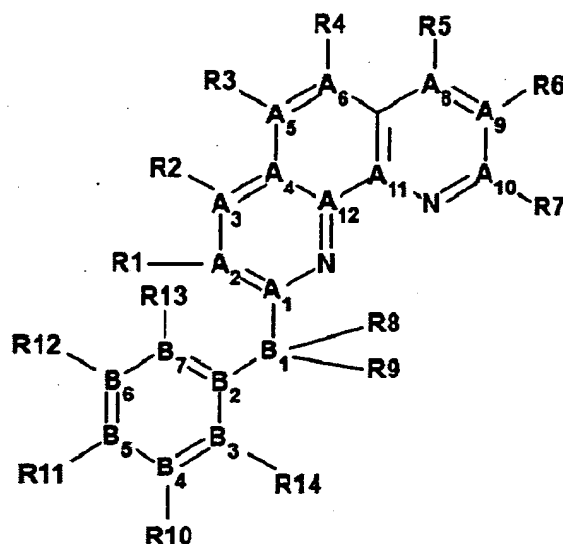
R₆ = hydrogen atom or isotope thereof

B₁-B₇ = carbon atom and/or heteroatom

R₁-R₁₀ = hydrogen atom and/or an isotope thereof, and/or one or more Cl, F, Br, amino groups, nitro groups, and/or one or more substituents selected from the group consisting of alkyl groups, ~~methyl or~~ and aryl groups, ~~and phenyl groups~~

R₁₁ = nitro group or a cyano group or a carboxylic acid group or a variant selected from the group consisting of an ester, amide, ketone or aldehyde group.

Claim 5 (Currently Amended). Substrate according to claim 1, wherein the reversible indicator has a skeletal structure according to the general formula II:



wherein A₁-A₁₂ = carbon atom and/or a heteroatom

R₁-R₇ = hydrogen atom and/or isotope thereof, and/or Cl, F, B, and/or substituents selected ~~form~~ from the group consisting of alkyl groups, ~~methyl or~~ and aryl groups, ~~and phenyl groups~~

R_8 = hydrogen atom or isotope thereof, or a substituent selected from the group consisting of Cl, F, Br, an alkyl group and an aryl group, ~~phenyl group, and pyridine~~

R_9 = hydrogen atom or isotope thereof

B_1 - B_7 = carbon atom and/or heteroatom

R_{10} - R_{13} = hydrogen atom and/or isotope thereof, and/or one or more Cl, F, Br, amino groups, nitro groups, and/or one or more substituents selected from the group consisting of alkyl groups, ~~methyl or~~ and aryl groups, ~~and phenyl groups~~

R_{14} = a nitro group, a cyano group, a carboxylic acid group, an ester, an amide, a ketone, or an aldehyde group.

Claim 6 (Previously Presented). Substrate according to claim 4, wherein in the general formula I, $R_4 = NO_2$ and 2-4 NO_2 groups are present.

Claim 7 (Previously Presented). Substrate according to claim 1, wherein the transfer reactions are based on large, charged or uncharged groups.

Claim 8 (Previously Presented). Substrate according to claim 1, wherein the transfer reactions are based on a charged or uncharged halogen atom.

Claim 9 (Previously Presented). Substrate according to claim 1, wherein the reversible indicator has more than one characteristic time domain.

Claim 10 (Previously Presented). Substrate according to claim 1, wherein at least two reversible indicators having different characteristic time domains are embedded in the matrix.

Claim 11 (Canceled).

Claim 12 (Previously Presented). Substrate according to claim 1, wherein at least one irreversible indicator having photochromic properties is arranged in the region of the reversible indicator.

Claim 13 (Previously Presented). Substrate according to claim 1, wherein the time-temperature integrator has a filter which is impermeable to light which effects photo-induced coloration of the reversible indicator.

Claim 14 (Previously Presented). Substrate according to claim 13, wherein the filter is impermeable to light in the wavelength range of below approximately 430 nm.

Claim 15 (Previously Presented). Substrate according to claim 1, wherein the substrate includes a reference scale arranged in the region of the time-temperature integrator.

Claim 16 (Previously Presented). Substrate according to claim 1, wherein the matrix is a polymer film.

Claim 17 (Previously Presented). Substrate according to claim 1, wherein the substrate is a polymer film.

Claim 18 (Previously Presented). Substrate according to claim 1, wherein a substrate region forms the matrix for the reversible indicator.

Claim 19 (Currently Amended). Process for determination of quality of products which are sensitive to aging and temperature comprising the steps of :

a) providing a substrate for packaging of or for attachment to a product which is sensitive to aging and temperature, having a time-temperature integrator arranged in the region of the substrate, wherein the time-temperature integrator contains a matrix and at least one reversible, crystalline indicator embedded therein, which has photochromic properties on the basis of transfer reactions in crystalline materials, and wherein further the reversible indicator is characterized by discoloration following photo-induced coloration thereof, the discoloration of the reversible indicator proceeding as a function of both time and temperature;

b) effecting photo-induced coloration of the reversible indicator; and

c) determining the degree of time-related and temperature-related discoloration and the quality of the product taking into account the degree of discoloration.

Claim 20 (Previously Presented). Process according to claim 19, wherein the determination of the quality of the product is effected by evaluating the degree of discoloration with the aid of a reference scale.

Claim 21 (Previously Presented). Process according to claim 19, further comprising the step of providing an irreversible indicator having photochromic properties, the irreversible indicator arranged in the region of the reversible indicator, and wherein further the irreversible indicator is applied after photo-induced coloration of the reversible indicator.

Claim 22 (Previously Presented). Process according to claim 19, further comprising the step of providing the time-temperature integrator with a filter that is impermeable to light which effects photo-induced coloration of the reversible indicator, and wherein further the filter is applied after photo-induced coloration.

Claim 23 (Previously Presented). Process according to claim 22 ~~19~~, wherein the photo-induced coloration of the reversible indicator is effected by UV or near UV light.

Claim 24 (Previously Presented). Process according to claim 22 49, wherein the photo activation of the time-temperature integrator is effected by irradiation of the side of the time-temperature integrator opposite the filter.

Claim 25 (Previously Presented). Substrate according to claim 5, wherein in the general formula II, $R_4 = \text{NO}_2$ and 2-4 NO_2 groups are present.

Claim 26 (New). Substrate according to claim 4, wherein:

$R_1\text{-}R_4$ = hydrogen atom and/or isotope thereof, and/or Cl, F, Br, and/or a substituent selected from the group consisting of methyl groups and phenyl groups

R_5 = hydrogen atom or isotope thereof, or a substituent selected from the group consisting of Cl, F, Br, a methyl group, a phenyl group, and pyridine

$R_1\text{-}R_{10}$ = hydrogen atom and/or an isotope thereof, and/or one or more Cl, F, Br, amino groups, nitro groups, and/or one or more substituents selected from the group consisting of methyl groups and phenyl groups.

Claim 27 (New). Substrate according to claim 4, wherein:

$R_1\text{-}R_7$ = hydrogen atom and/or isotope thereof, and/or Cl, F, B, and/or substituents selected from the group consisting of methyl groups and phenyl groups

R_8 = hydrogen atom or isotope thereof, or a substituent selected from the group consisting of Cl, F, Br, a methyl group, a phenyl group, and pyridine

R_{10} - R_{13} = hydrogen atom and/or isotope thereof, and/or one or more Cl, F, Br, amino groups, nitro groups, and/or one or more substituents selected from the group consisting of methyl groups and phenyl groups.